morrison

# DINOSAURS!

**•DISCOVER THE GIANTS OF THE PREHISTORIC WORLD•**

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# DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

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# ANCHICERATOPS

**Large, lumbering *Anchiceratops* had two long, pointed eyebrow horns.**

As long as a bus, *Anchiceratops* had a body similar in shape to some of its relatives, such as *Torosaurus* and *Chasmosaurus*. But each of these ceratopians could be identified by its distinctive combination of horns and frill shapes. This gave them a sort of uniform, so they could recognise each other easily.

## FOOD FUSS

*Anchiceratops* had a long, narrow face with a short, stubby nose horn above its nostrils and two bigger horns over its eyes. Rather than sweeping up large mouthfuls of plants, *Anchiceratops* was more fussy about its food. It nipped off the shoots of low-level greenery, using its sharp, curved beak very precisely. Its back teeth sliced through the leaves like scissors.

## LIGHTWEIGHT FRILL

The neck frill of *Anchiceratops* was as long as its skull. But two small openings or 'windows' in the bone made the frill quite light. The dinosaur only had to lower its head to show off the frill in all its glory.

## BONY BITS

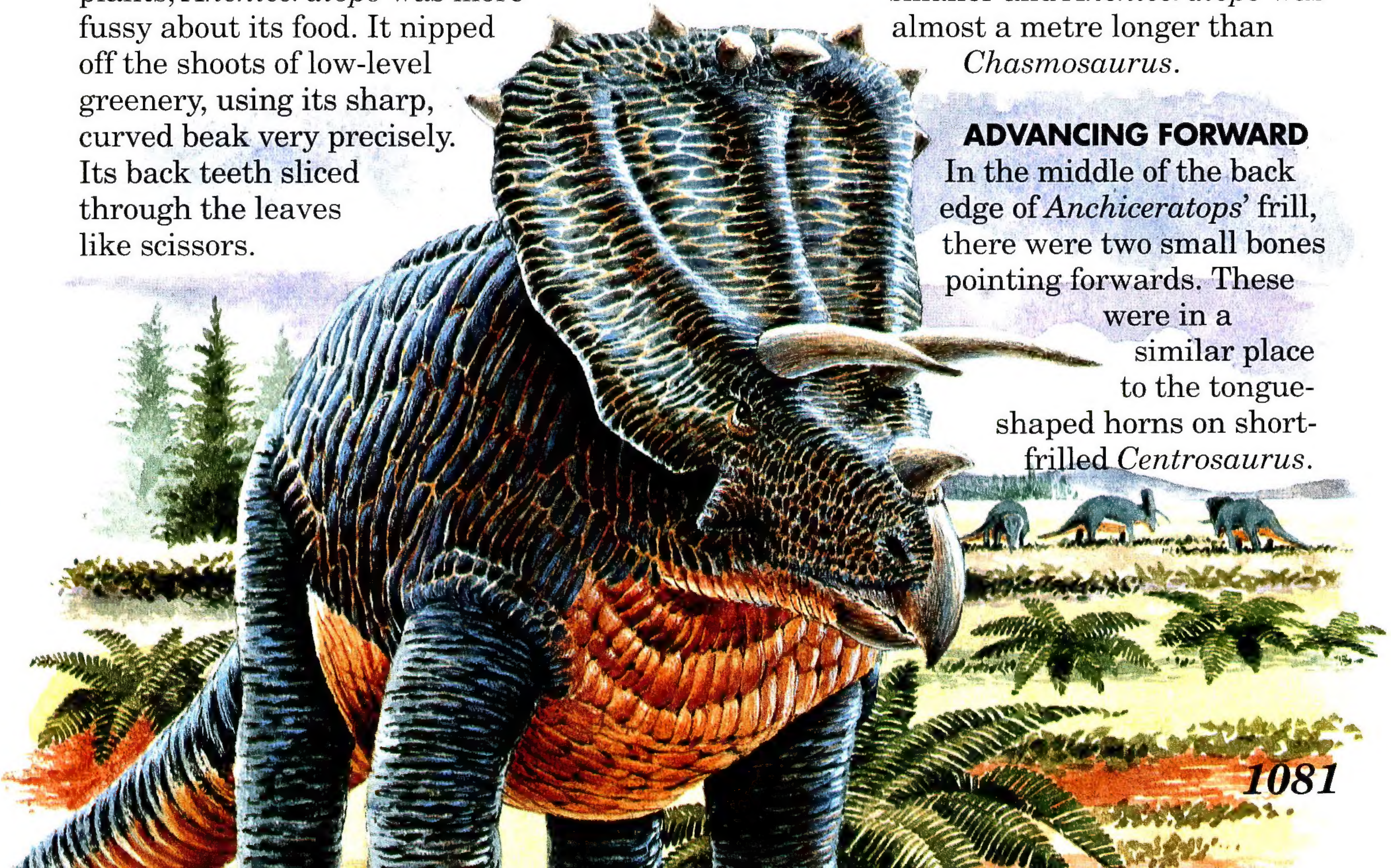
Three pairs of bony knobs stood out from the top edge of *Anchiceratops*' frill. But the small, pointed bones did not run along the sides of the frill, in the way that they decorated the frill of *Chasmosaurus*.

## FAMILY RESEMBLANCE

*Anchiceratops* was very like *Chasmosaurus* but fossils tell scientists they were two different dinosaurs. *Anchiceratops*' brow horns were longer, the openings in its frill smaller and *Anchiceratops* was almost a metre longer than *Chasmosaurus*.

## ADVANCING FORWARD

In the middle of the back edge of *Anchiceratops*' frill, there were two small bones pointing forwards. These were in a similar place to the tongue-shaped horns on short-frilled *Centrosaurus*.



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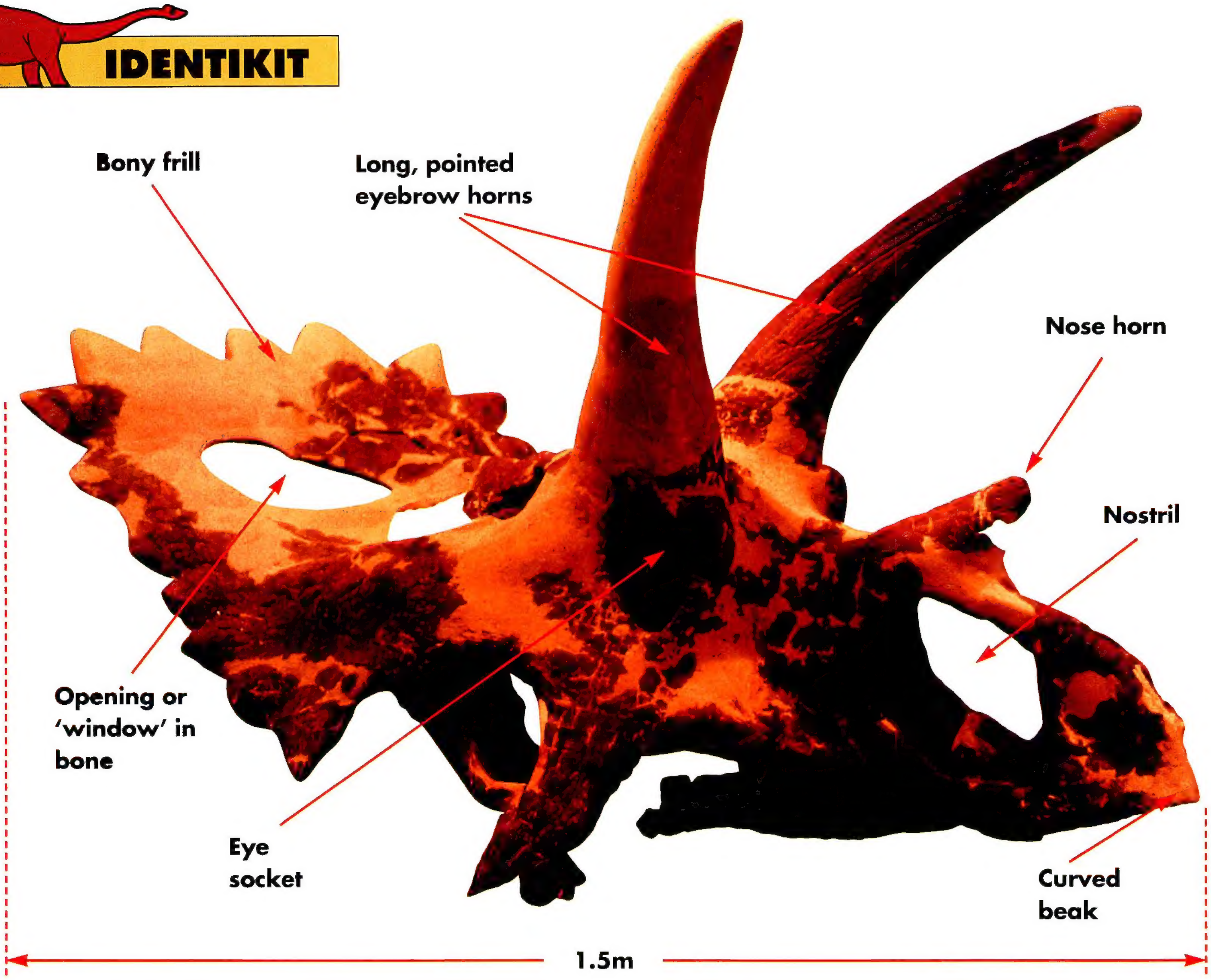
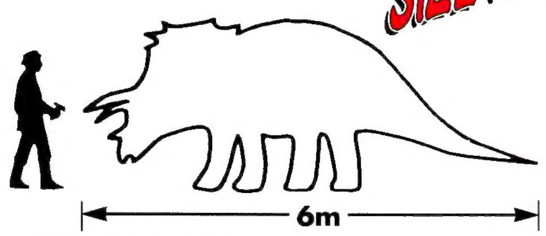


## MONSTER FACTS

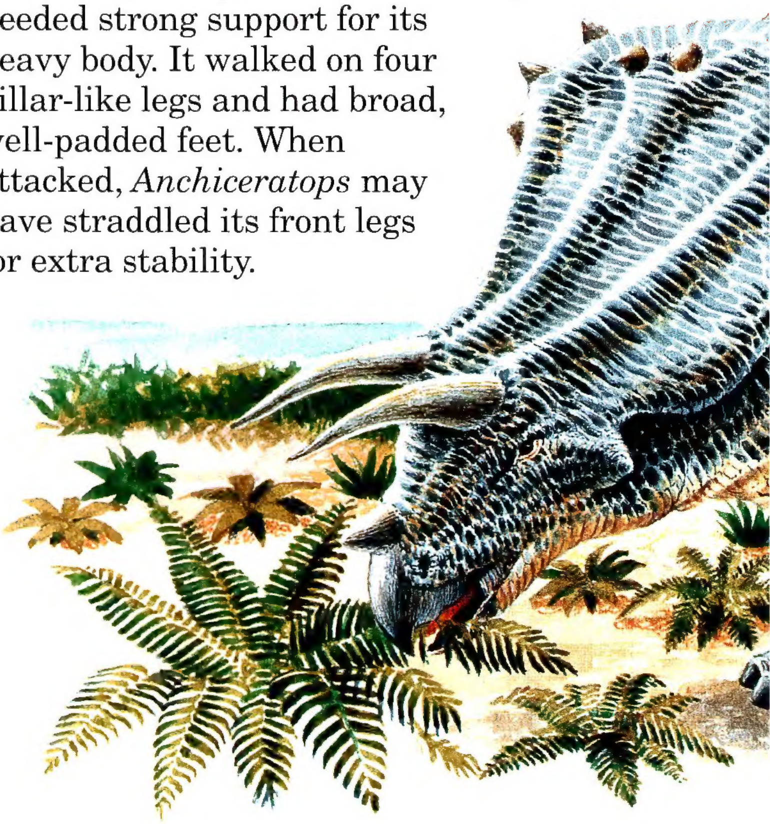
- **NAME:** *Anchiceratops* (an-ki-serra-tops) means 'close-horned face'
- **SIZE:** up to 6m long
- **FOOD:** low-growing plants
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in Alberta, Canada

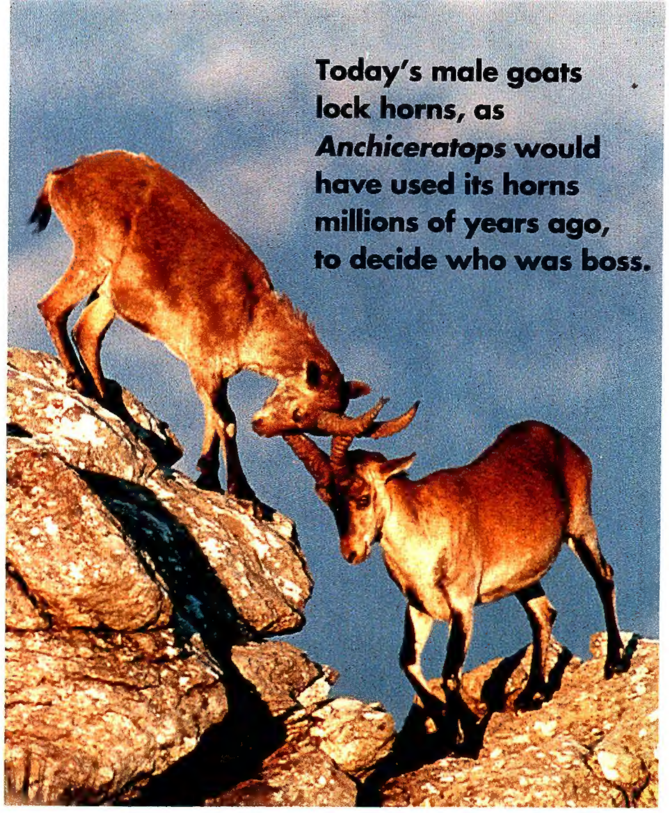
## SIZE WISE



### SURE-FOOTED

Like today's elephant, *Anchiceratops* needed strong support for its heavy body. It walked on four pillar-like legs and had broad, well-padded feet. When attacked, *Anchiceratops* may have straddled its front legs for extra stability.





**Today's male goats lock horns, as *Anchiceratops* would have used its horns millions of years ago, to decide who was boss.**

## IT'S A FACT

### HORNS AND FINGERNAILS

Believe it or not, you have something in common with a horned dinosaur! Dinosaur horns were strengthened by a covering of tough keratin – the same substance that your fingernails are made of!

### WHO'S IN CHARGE?

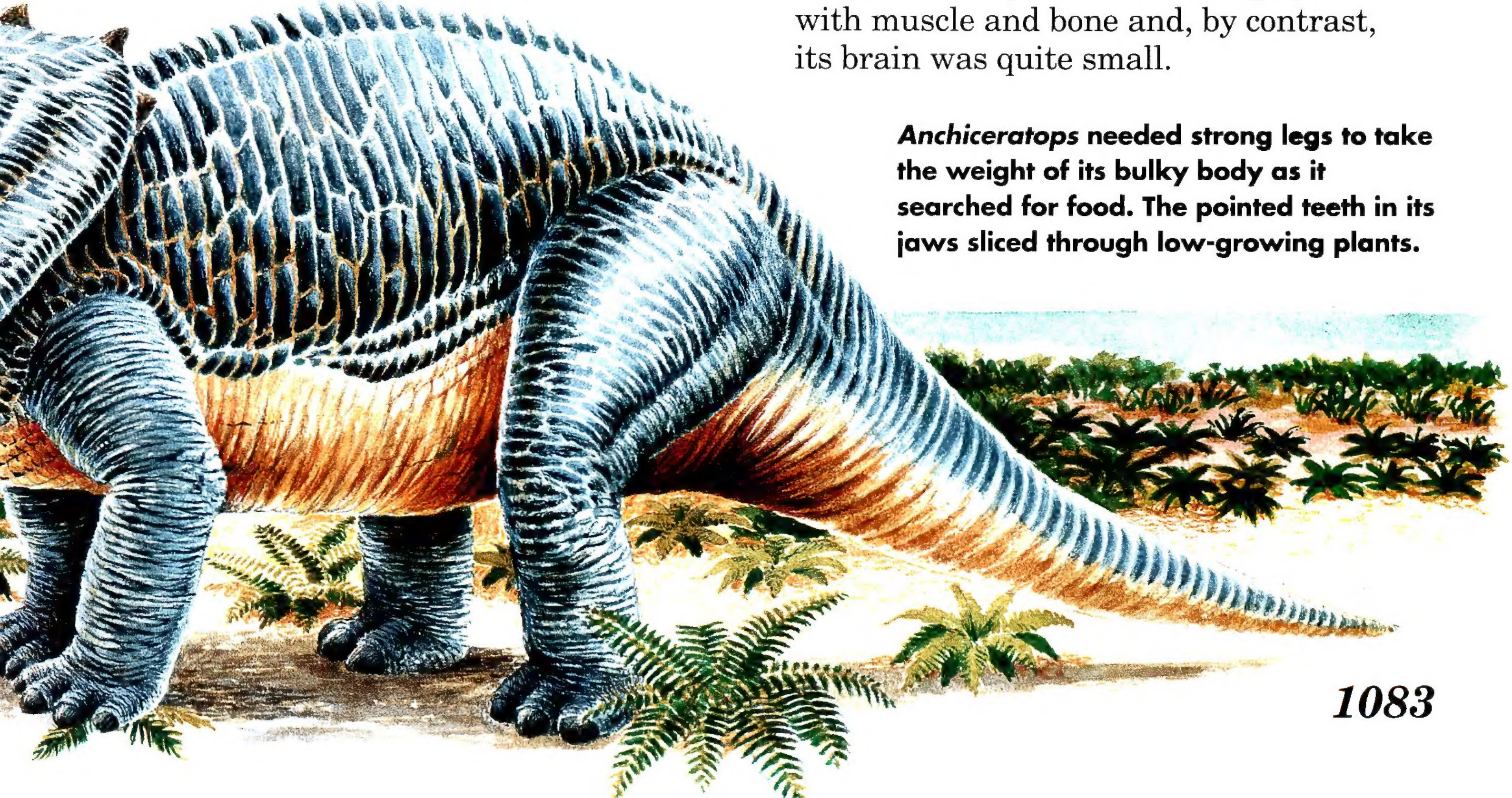
Experts believe ceratopians such as *Anchiceratops* were sociable creatures that lived together in herds, like many modern mammals. Have you noticed how, in a large group of people, someone often seems to take charge? In a large herd of horned dinosaurs, leaders also emerged. But sometimes they had to fight with each other to decide who would lead the herd.

### LOCKING HORNS

*Anchiceratops* probably locked horns with a rival in the way that stags do today. The winner of this trial of strength would have established its seniority and have first choice of a mate. Sometimes it may simply have been enough for *Anchiceratops* to wave its impressive frill in the air.

### BIG HEAD, SMALL BRAIN

Although it had a huge head, *Anchiceratops* did not have a brain to match! A human skull, although much smaller, is almost full of brain. The space in *Anchiceratops'* skull was largely filled with muscle and bone and, by contrast, its brain was quite small.

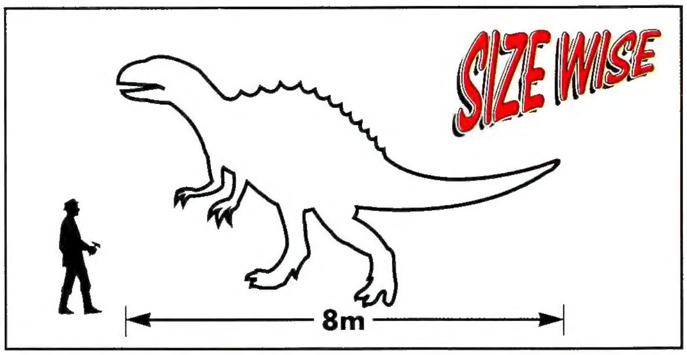


***Anchiceratops* needed strong legs to take the weight of its bulky body as it searched for food. The pointed teeth in its jaws sliced through low-growing plants.**

# BECKLESPINAX

**As long as two cars, flesh-eating *Becklespinax* roamed the forests and plains of southern England.**

Plant-eaters such as *Iguanodon* and *Hypsilophodon* lived alongside *Becklespinax* and were probably in constant fear of a sudden ambush from this fierce predator.

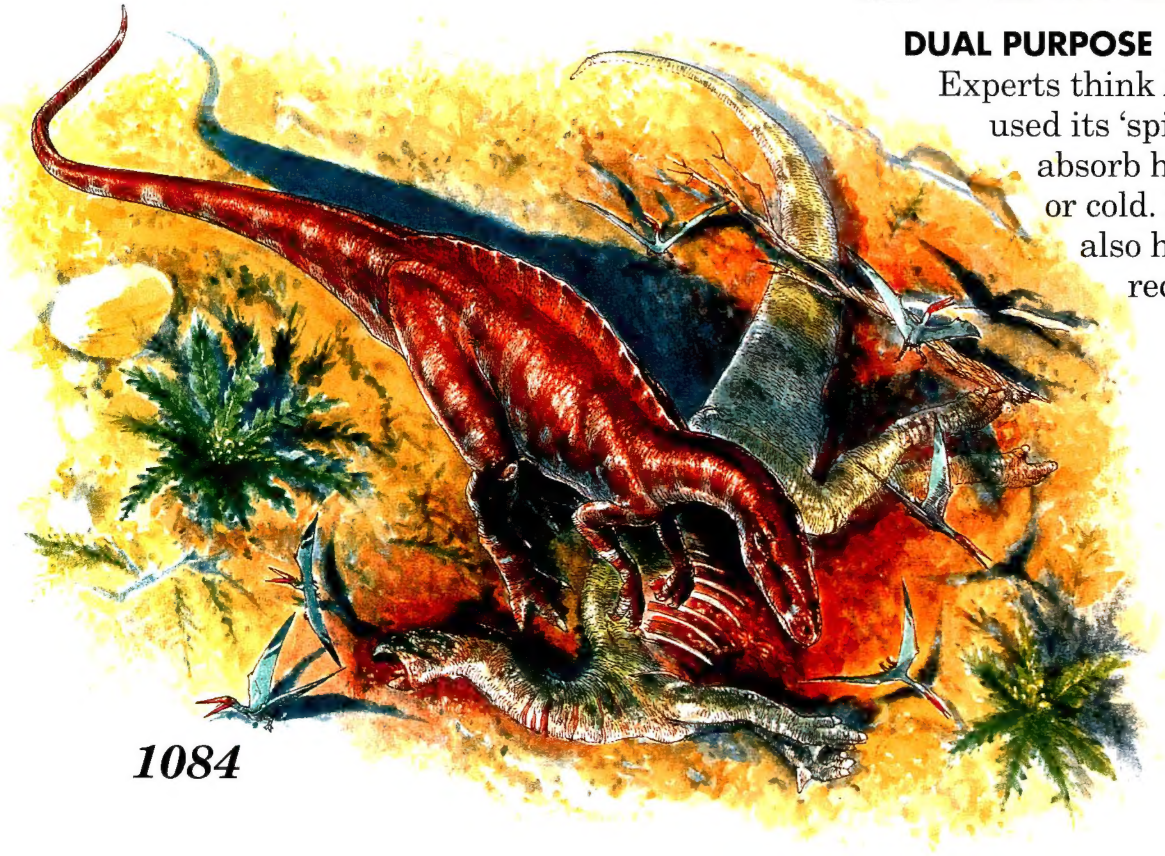


## BACKBONE CLUE

Little is known about *Becklespinax* and at times it has been confused with other dinosaurs such as *Megalosaurus*. The identity of this large theropod is based on part of the backbone and spines found in Sussex, England. The tall spines may have supported a sail of skin or a high ridge along the back of *Becklespinax*.

## MONSTER FACTS

- **NAME:** *Becklespinax* (bek-kel-spine-ax) means 'Beckles' spined reptile' after the British fossil collector, Samuel Beckles
- **SIZE:** up to 8m long
- **FOOD:** meat
- **LIVED:** about 120 million years ago in the Early Cretaceous Period in southern England and Germany



## DUAL PURPOSE

Experts think *Becklespinax* may have used its 'spine sail' to lose or absorb heat when it got too hot or cold. Its high, curved back also helped other dinosaurs recognise *Becklespinax*.

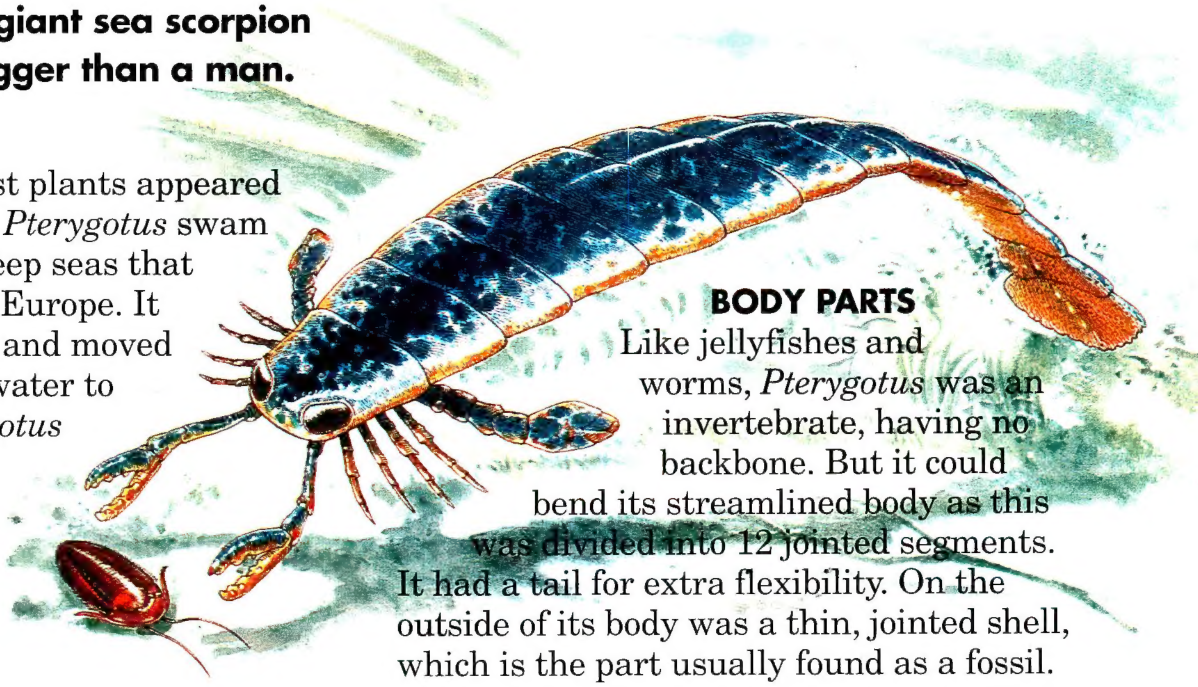
## LEFTOVERS

With its stabbing teeth and sharp, curved claws, *Becklespinax* ripped the flesh of its prey. It may also have fed off the carcasses of dead dinosaurs.

# PTERYGOTUS

***Pterygotus* was a giant sea scorpion that grew to be bigger than a man.**

As the first plants appeared on land, *Pterygotus* swam in the deep seas that once covered central Europe. It was a deadly hunter and moved swiftly through the water to catch its prey. *Pterygotus* was probably a scavenger as well, and ate the remains of dead sea creatures that floated near the bottom of the ocean.



**BODY PARTS**
Like jellyfishes and worms, *Pterygotus* was an invertebrate, having no backbone. But it could bend its streamlined body as this was divided into 12 jointed segments. It had a tail for extra flexibility. On the outside of its body was a thin, jointed shell, which is the part usually found as a fossil.

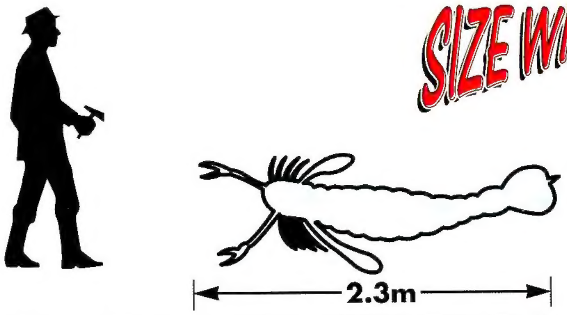
**HUGE PINCERS**
On the front half of its body, *Pterygotus* had six pairs of limbs. The first pair provided *Pterygotus* with a deadly hunting weapon – positioned in front of its large eyes were two huge, toothed pincers! With these, the giant sea scorpion grabbed small creatures and drew them in to its mouth.

**POWERFUL PADDLES**
Just behind its fearsome pincers, *Pterygotus* had four pairs of legs which were roughly equal in size, and another much larger pair. The broad back limbs helped to propel the prehistoric animal through the water like paddles or oars. Their wide surface worked like a diver's flippers, giving *Pterygotus* the extra speed and manoeuvrability it needed to catch fast-swimming prey.

## MONSTER FACTS

- **NAME:** *Pterygotus* (teri-goat-us) means 'winged scorpion'
- **SIZE:** up to 2.3m long
- **FOOD:** small sea creatures and fish
- **LIVED:** between 440 and 395 million years ago in the Silurian Period in the ancient seas which once covered Europe

## SIZE WISE



# Ice Ages and mammals

**Snow and ice are good fun for a few days. But would you like them all year round, with temperatures hardly ever above freezing?**

That's what parts of Britain were like thousands of years ago – covered in ice sheets, with bone-chilling winds and snow all year round. It was the time of the Ice Ages. Many huge mammals that are now extinct scratched a living from the frozen land.

### GLACIALS AND INTERGLACIALS

There have been many Ice Ages since the world began. What we often call 'The Ice Age' covers several periods of intense cold, with warmer times between. The cold periods are called glacials, and the warm ones interglacials. The Ice Ages began about two million years ago. The last glacial began to fade about 12,000–10,000 years ago.

### COOLING DOWN

At the end of the Tertiary Period, much of the world basked in tropical conditions. But slowly, it turned colder. Great ice sheets up to 3km thick began to spread from the North Pole. Fast-flowing rivers turned into creeping glaciers.

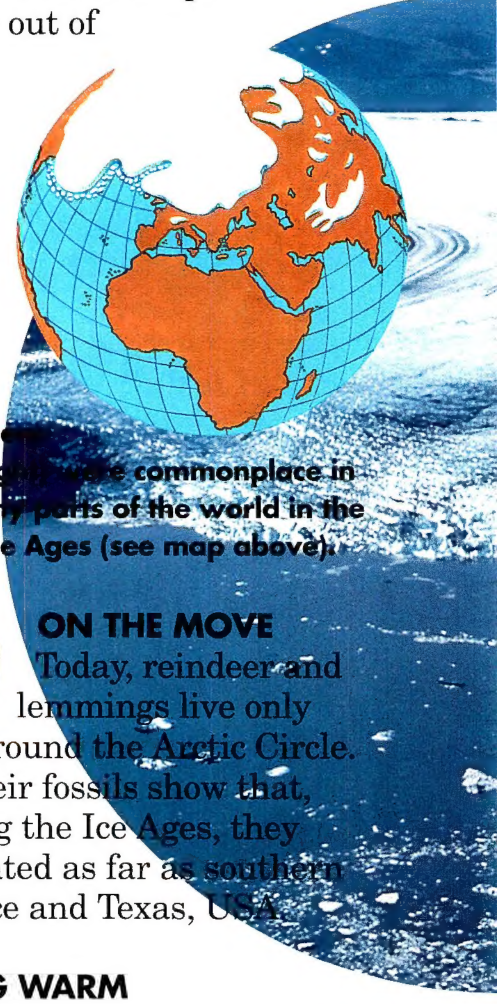
**Like the mammoth, the Ice-Age woolly rhino (right) developed hair for warmth.**

### HOW TO SURVIVE

If plants and animals were to survive, they either had to adapt to the cold or move out of the way.

### GOING SOUTH

As the northern ice spread south, the vegetation and animals moved ahead of it.



**Glaciers like this modern-day one in Alaska (right) were commonplace in many parts of the world in the Ice Ages (see map above).**

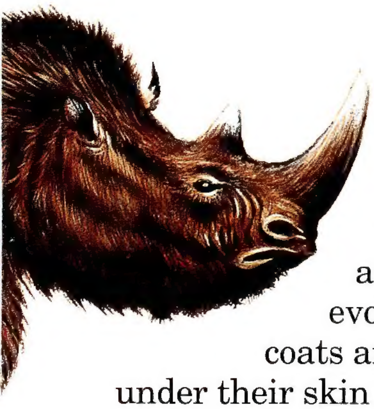
### ON THE MOVE

Today, reindeer and lemmings live only around the Arctic Circle. But their fossils show that, during the Ice Ages, they migrated as far as southern France and Texas, USA.

### KEEPING WARM

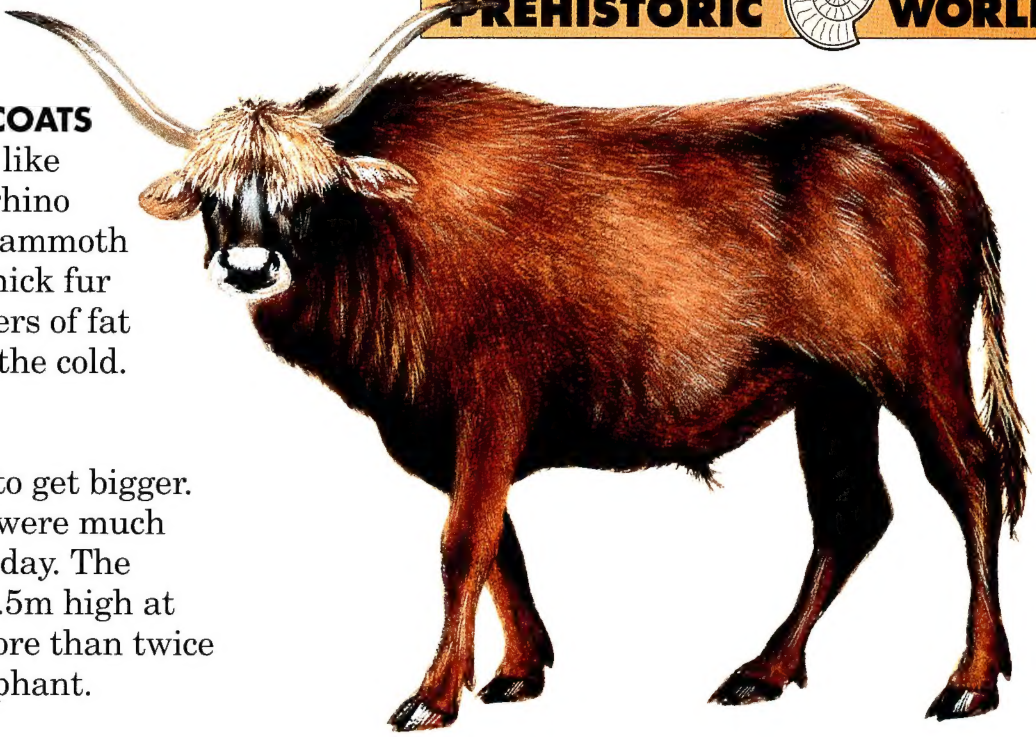
Mammals have an advantage over many other creatures. They have warm blood. So they can stay active in icy weather that would freeze cold-blooded reptiles and amphibians.

**To help it survive the cold, the Ice-Age elk (left) evolved to be much bigger than any deer today. Its antlers were 2.5m across!**



## WINTER COATS

Mammals like the woolly rhino and woolly mammoth evolved long, thick fur coats and thick layers of fat under their skin to keep out the cold.



## GETTING BIGGER

Another way to save heat is to get bigger. So, many Ice-Age mammals were much bigger than their relatives today. The steppe mammoth was over 4.5m high at the shoulder and weighed more than twice as much as a big modern elephant.

## GETTING SMALLER

Large amounts of heat are lost from the bits of a body that stick out such as the ears, nose, tail and feet. If these parts are smaller, less heat is lost. So many Ice-Age mammals had big bodies, small ears, short noses, small tails and feet!

**Animals such as the cave bear (below) which grew to be enormous, had a small surface area compared with their volume and lost less heat.**

**Today's hairy musk ox (below) is better designed to cope with the cold than its prehistoric ancestor the auroch (above).**

## Is it true that people today have eaten mammoth meat?

Yes, they have. Mammoths themselves died out about 10,000 years ago. But in Siberia and Alaska, mammoth bodies have been found frozen solid in ice, like a natural deep-freezer. Thawed out, some of the meat can still be eaten. At a famous Russian banquet in the last century, scientists dined on mammoth steaks – but they didn't taste very nice!

## STICKY STUFF

About 11,000 years ago, near present-day Los Angeles in California, USA, there were natural pools of thick, sticky tar. The tar welled up from the ground – and it was a death trap. Leaves and rainwater collected on the surface, disguising the tar below.

## TRAPPED IN TAR

Elephants, horses, deer and ground sloths wandered nearby or came to drink the water. They got stuck. As they struggled in panic, they attracted the attention of meat-eaters such as sabre-toothed cats and dire wolves. The hunters pounced on their prey but they got stuck, too. Gradually the doomed creatures sank into the blackness.

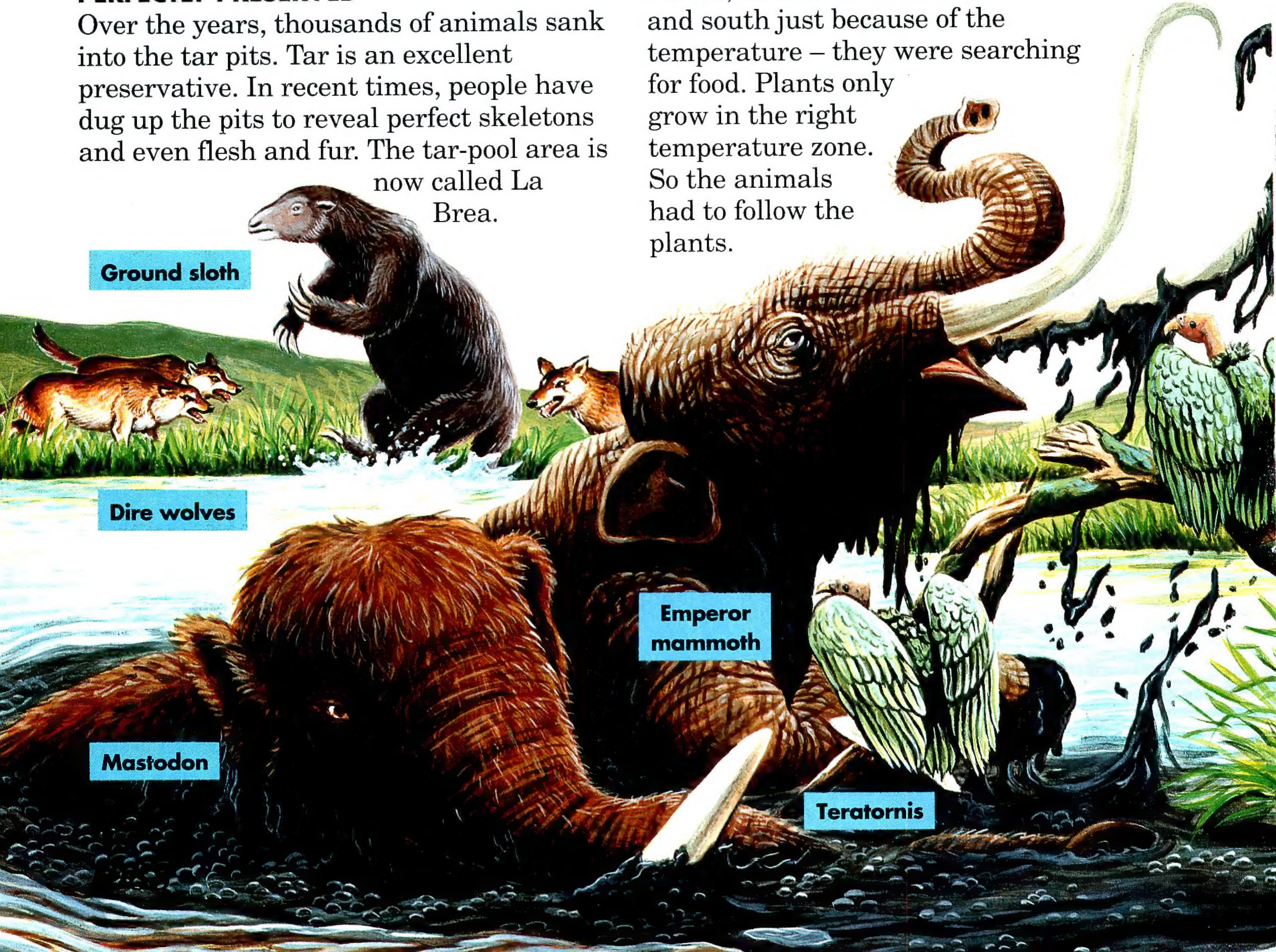
## PERFECTLY PRESERVED

Over the years, thousands of animals sank into the tar pits. Tar is an excellent preservative. In recent times, people have dug up the pits to reveal perfect skeletons and even flesh and fur. The tar-pool area is now called La Brea.

**Thousands of prehistoric mammals met their death at the La Brea tar pits (above) in the USA.**

## THE WARM TIMES

The La Brea tar pits formed during a warm, interglacial period. During these times, the ice sheets shrank back towards the north, and the animals followed them. Then as the ice returned, over thousands of years, the animals went south again. Of course, mammals did not move north and south just because of the temperature – they were searching for food. Plants only grow in the right temperature zone. So the animals had to follow the plants.



### BACK UP NORTH

During the interglacials, warmth-loving animals moved north. Fossils of elephants and hippos have been found in northern England. Wild pigs, bison, deer, cave lions, brown bears and hyaenas also lived farther north than their descendants do today.

### THE GREAT EXTINCTION

Ice-Age mammoths, mastodons, woolly rhinos and cave bears died out. This may have been due to natural evolution. As the world became warmer, the mammals' cousins which were better adapted to the warm, took over.

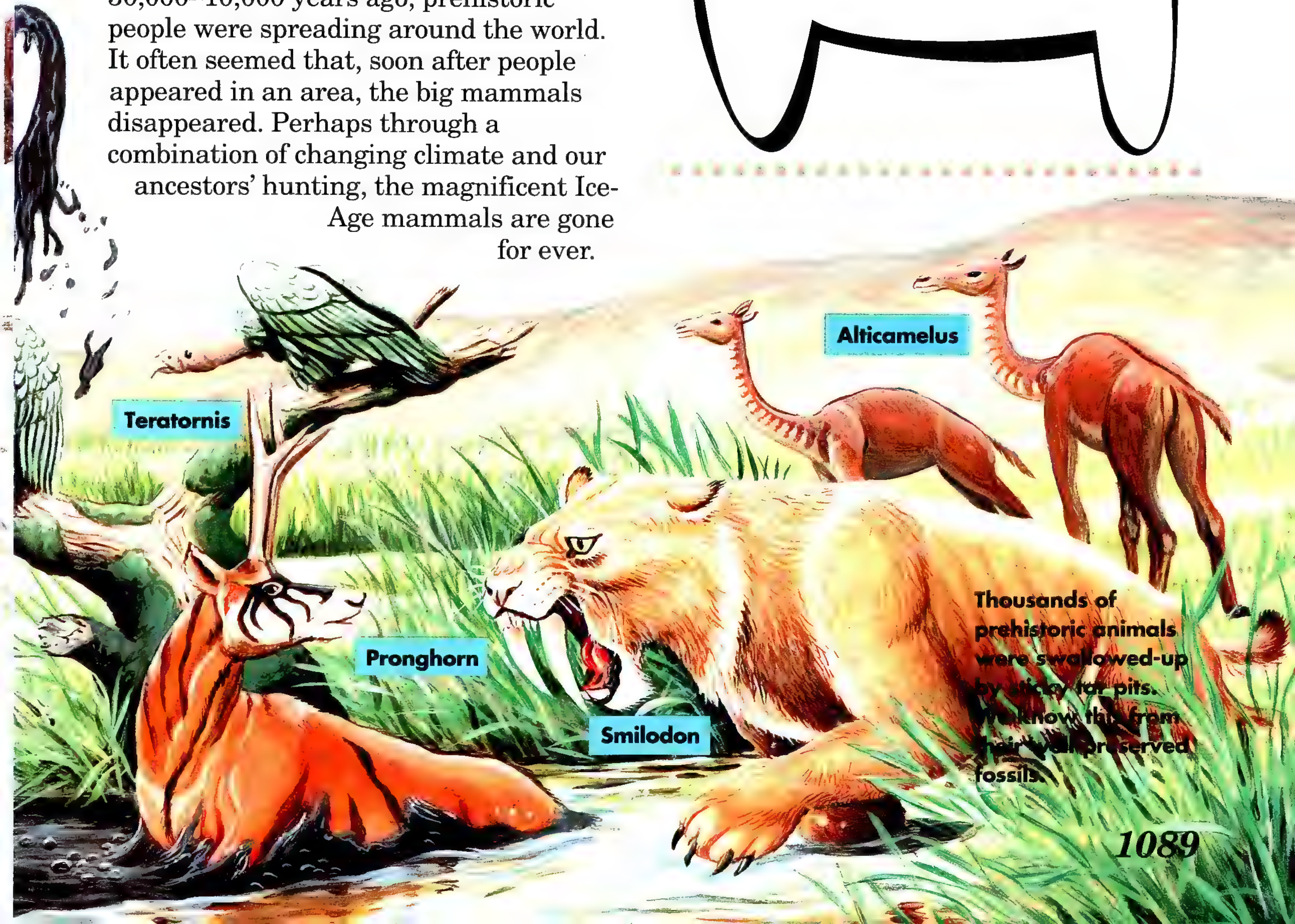
### PREHISTORIC PEOPLE

During the last main Ice Age, about 30,000–10,000 years ago, prehistoric people were spreading around the world. It often seemed that, soon after people appeared in an area, the big mammals disappeared. Perhaps through a combination of changing climate and our ancestors' hunting, the magnificent Ice-Age mammals are gone for ever.

## IT'S A FACT

### THAT WE ARE STILL IN AN ICE AGE

No-one is sure what causes Ice Ages. Changes in the world's winds, ocean currents, cloud cover and rainfall are important. Ice Ages may occur when these conditions are all going in a 'cooling direction'. Or, they may be due to the slight 'wobble' of the Earth as it spins in space. Many scientists think the last great Ice Age is still continuing and that we are in a warm interglacial period now. Over the next 20,000 years it may gradually get colder again.



**Thousands of prehistoric animals were swallowed-up by sticky tar pits. We know this from their well-preserved fossils.**

# GIANTS OF THE PAST

# ANCHICERATOPS

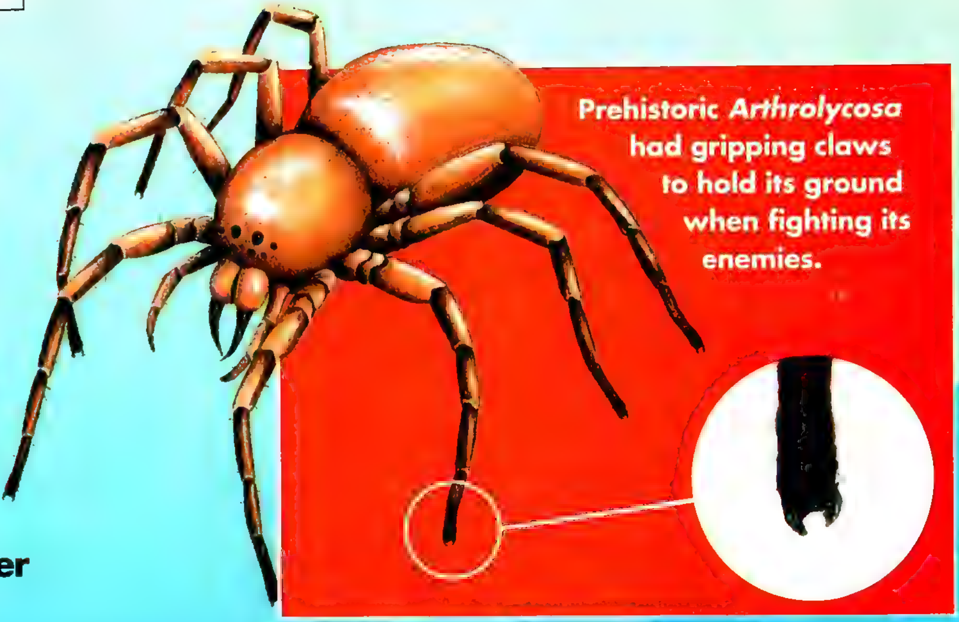
In Late Cretaceous North America two herds of plant-eating dinosaurs come face to face. The small, but tough *Stegoceras* stand their ground, as the larger *Anchiceratops* display their magnificent frills. A bloody battle is unlikely, as neither the dome-headed dinosaurs nor *Anchiceratops* are fierce predators.

# 3-D Gallery 55

## MOSASAURUS AND ANATOTITAN

In the cruel waters of the Late Cretaceous Period, giant monsters lurk hidden. Despite the keen eyesight and good hearing of plant-eating *Anatotitan*, when *Mosasaurus* emerges from nearby murky depths, it terrifies the defenceless herd.

# Killer claws



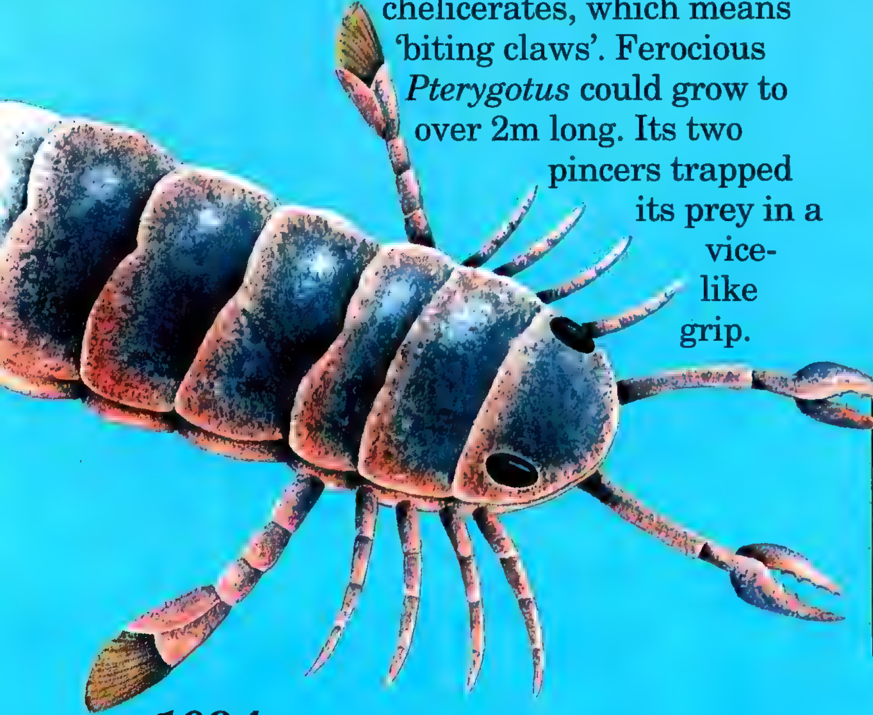
Prehistoric *Arthrolycosa* had gripping claws to hold its ground when fighting its enemies.

**Some of the earliest animals on Earth had killer claws and deadly fangs.**

Long before dinosaurs existed, animals called arthropods appeared on Earth. They had lots of jointed legs and no backbone.

### TERROR OF THE OCEANS

Around 400 million years ago, in the ancient seas, there lurked one of the largest arthropods – *Pterygotus*, an ancestor of today's scorpion. *Pterygotus* had claws, as did early scorpions and spiders. These arthropods were called chelicerates, which means 'biting claws'. Ferocious *Pterygotus* could grow to over 2m long. Its two pincers trapped its prey in a vice-like grip.



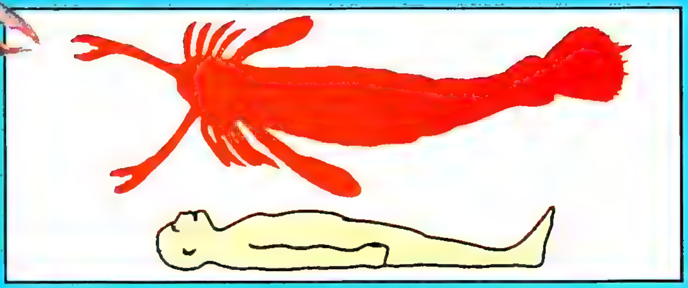
### DEADLY SPIDER

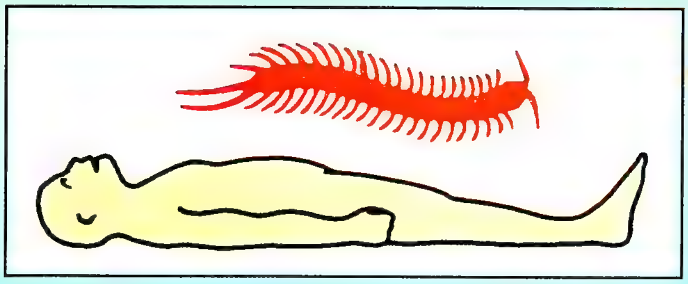
One of the oldest animals on Earth is the spider. *Arthrolycosa* was a spider that lived about 340 million years ago. It had eight legs, eight eyes and two small, gripping claws at the ends of each of its legs. It used these to steady itself when grappling with an enemy. *Arthrolycosa* probably attacked insects with its deadly, poisoned fangs or 'biting claws'. As the spider clamped its jaws around its victim, poison was injected through a tiny hole near the end of each fang.

### CLIMBING GEAR

Today's spiders still have gripping claws. They use them for climbing and for clinging on to their webs. Some also have poisonous fangs, like *Arthrolycosa*.

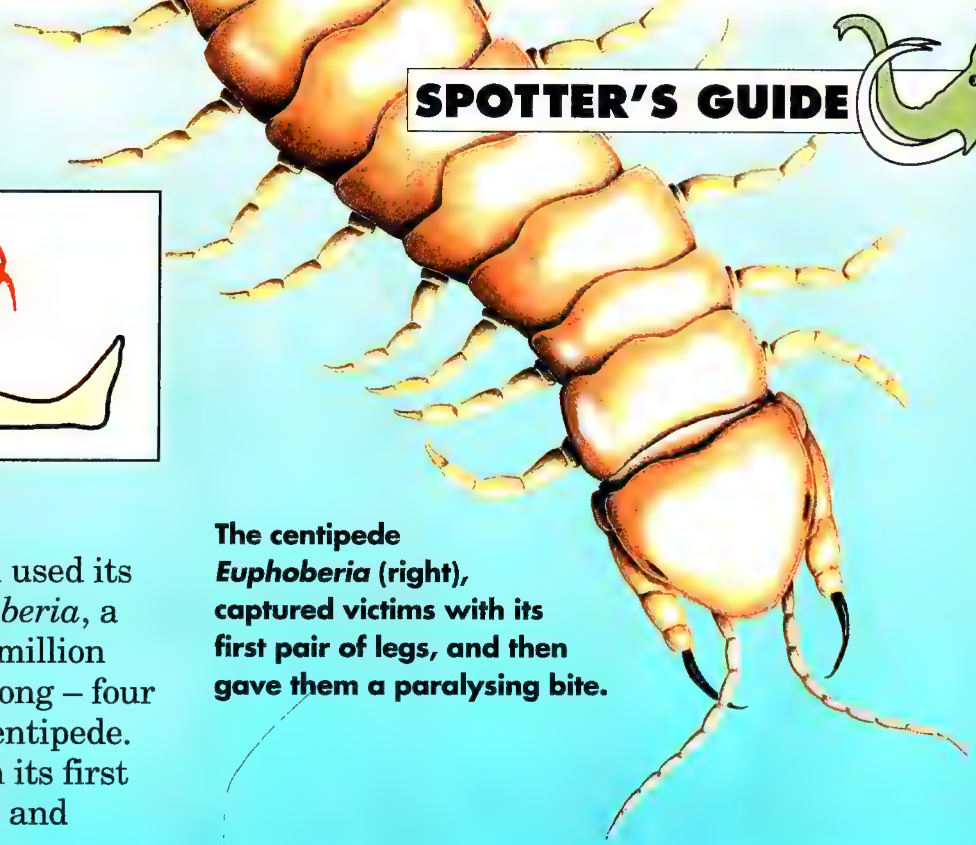
***Pterygotus* (left) was a fearsome sea scorpion. Its strong pincers held on tight to its squirming prey.**





## GIANT CENTIPEDE

Another ancient arthropod which used its claws to seize its prey was *Euphoberia*, a giant centipede. It appeared 250 million years ago and grew to about 1m long – four times as long as today's largest centipede. *Euphoberia* grabbed its prey with its first pair of legs, pulled it to its mouth and paralysed it with a poisonous bite.



**The centipede *Euphoberia* (right), captured victims with its first pair of legs, and then gave them a paralysing bite.**

## STING IN THE TAIL

The ancient scorpion, *Palaeophonus* lived over 400 million years ago and was possibly the first land animal. A fierce predator, it may have hunted at night like today's scorpion. Its tail was deadly and its two 'biting claws' were like huge pincers.

**The prehistoric cockroach *Apthoroblattina* has hardly changed in over 250 million years. It looks almost the same as a cockroach today except that in prehistory it was over six times bigger, with gripping claws to match!**

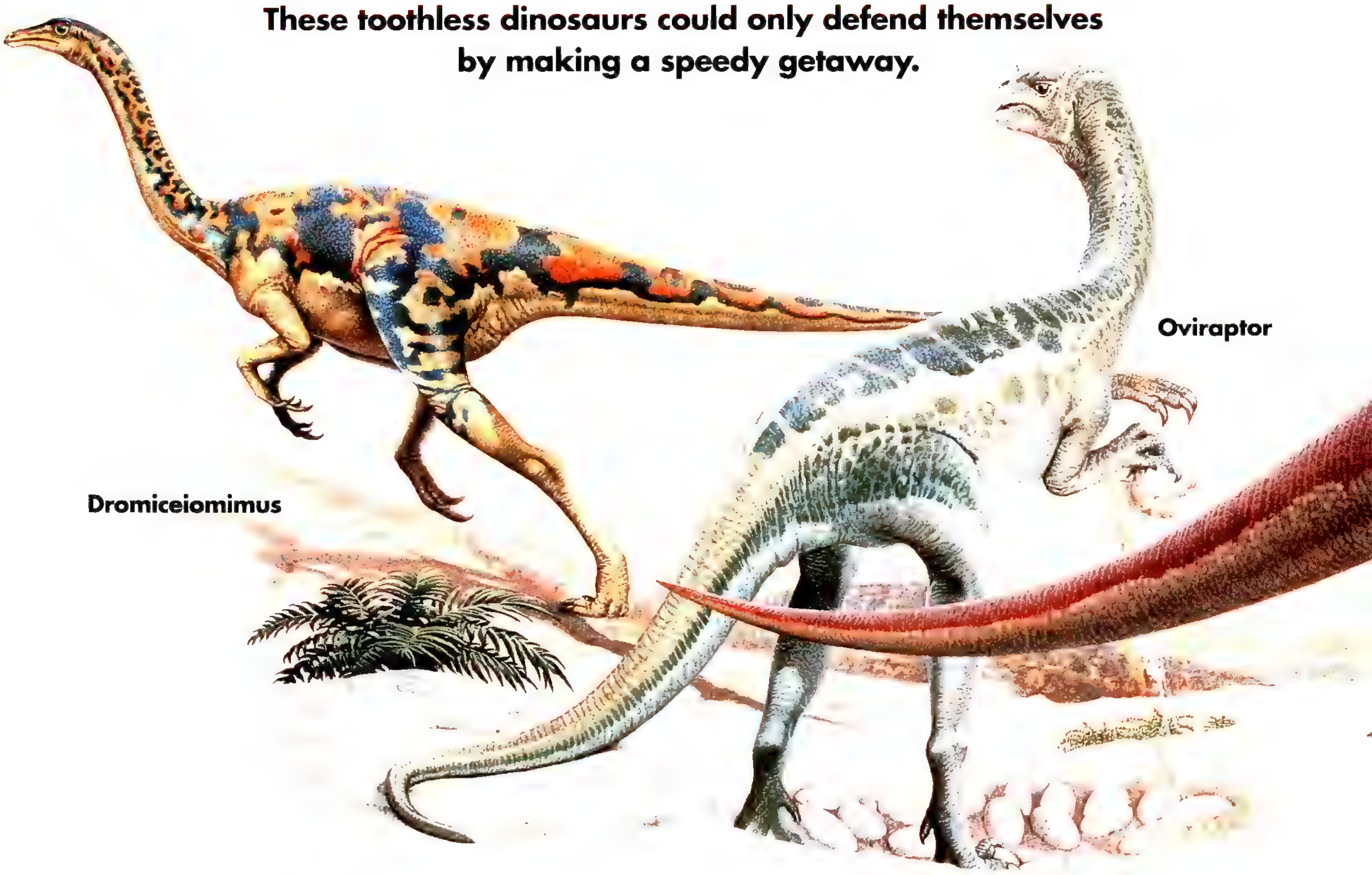
**Land scorpion *Palaeophonus* had fearful pincers and a deadly sting in its tail!**

## APPLAUSE FOR CLAWS

So, prehistoric arthropods used their claws mainly for defence and attack – snatching up their prey and tearing it to pieces. Their claws also helped them to grip the ground in battle. And some females used their sharp claws to dig a hole in the sand or earth, before laying their eggs.

# Introducing the bird dinosaurs

**These toothless dinosaurs could only defend themselves by making a speedy getaway.**



With their long legs and light bodies, the bird-like ornithomimosaurs and oviraptorosaurs must have been speedy movers. Like today's ostrich – which is the fastest flightless bird – these dinosaurs could have sprinted at speeds of 50km/h. Some of them may even have darted along at more than 70km/h.

## TWO FAMILIES

*Dromiceiomimus* and *Struthiomimus* were ornithomimosaurs, meaning 'bird mimics'. They are also known as ostrich dinosaurs because of their similarity to modern ostrich-like birds. Some ornithomimosaurs were probably omnivores, eating almost anything, while others were insect-eaters. *Oviraptor* was an oviraptorosaur or 'egg thief' and feasted on stolen dinosaur eggs.

## ORNITHOMIMOSAUR CHECK LIST

- TWO-LEGGED
- TOOTHLESS BEAK
- FAST MOVER
- LONG NARROW HEAD

Struthiomimus

**The resemblance of oviraptorosaurs and ornithomimosaurs to today's ostrich bird is obvious, with the exception that the dinosaurs were featherless and wingless. While today's ostrich uses its short wings for balance, *Oviraptor* used its tail.**

### FAMILY RELATIONS

*Oviraptor* gave its name to the oviraptorosaurs – 'egg-stealing reptiles' – and is the best-known family member. Many more of the ornithomimosaurs – like *Ornithomimus*, *Struthiomimus* and *Dromiceiomimus* – are known from fossil finds.

### CRETACEOUS CREATURES

The ornithomimosaurs roamed the Earth in the Cretaceous Period. *Archaeornithomimus* was first on the scene around 100 million years ago, followed by *Ornithomimus* and *Struthiomimus* 25 million years later. Then came *Dromiceiomimus* and *Gallimimus.*

### AT THE END

Along with *Ornithomimus, Gallimimus* survived right through to the end of the Age of the Dinosaurs. *Oviraptor* also lived in Cretaceous times.and arrived on Earth around 80 million years ago.

## IT'S A FACT

### LOOKALIKES

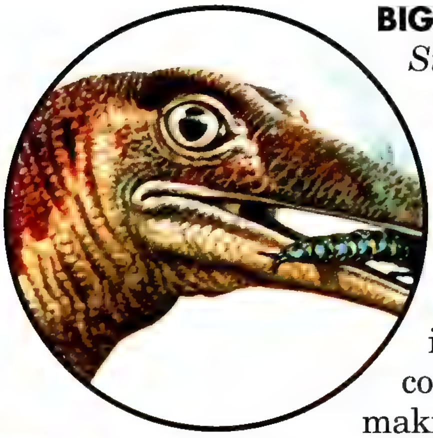
*Struthiomimus* and *Ornithomimus* looked so alike they even confused the experts. Early *Struthiomimus* fossils were wrongly described as *Ornithomimus* skeletons. It was only later that scientists realised they were dealing with two different types of dinosaur.

## LONG AND SHORT

The ornithomimosaurs or ostrich dinosaurs were all medium-sized dinosaurs. *Gallimimus* was probably the largest, growing up to 4m long. *Ornithomimus* was smaller, about 2.5m long. *Oviraptor* was about 1.8m long – the same length as a man lying down.

## BIG EYES

*Struthiomimus* must have looked very like a bird with its long, toothless beak and large eyes. Scientists think its jaws were covered in horn making them even more bird-like.



***Struthiomimus* had big eyes and a beak, like a bird.**

## FLEXIBLE EATERS

The light, delicate bones in an ostrich dinosaur's skull made the skull very flexible. The beak was long and bendy, so that the dinosaur was able to tackle a wide range of foodstuffs – in the way that an ostrich can today.

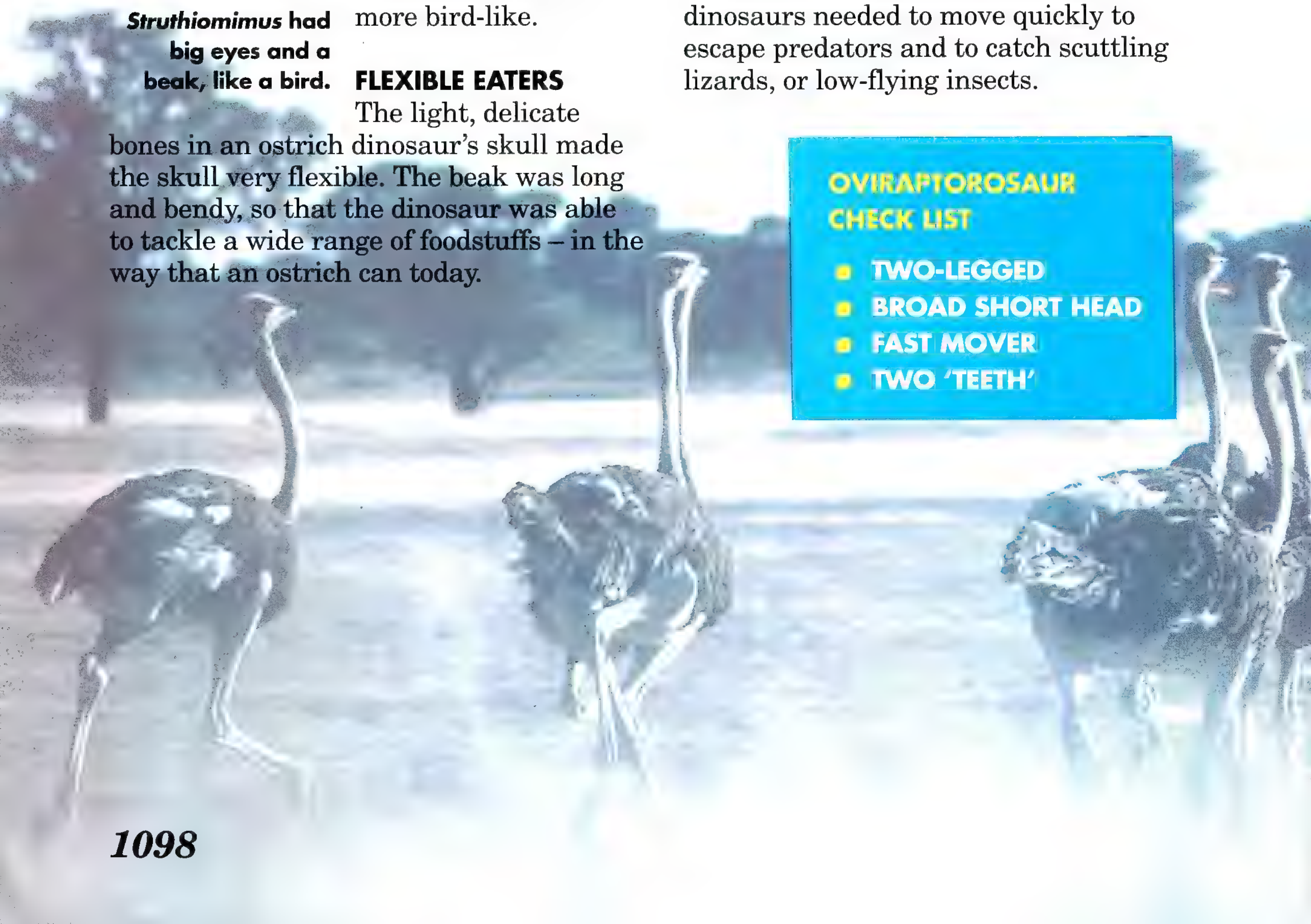
## QUICK GETAWAY

The long, strong back legs of an ostrich dinosaur were built for speed. The dinosaur had special leg muscles which enabled it to travel extremely fast. The feet also show that it was a running dinosaur. It would have used the narrow, flattened claws on its back legs to grip the ground as it dashed along. Ostrich dinosaurs needed to move quickly to escape predators and to catch scuttling lizards, or low-flying insects.

**Ostrich dinosaurs like *Struthiomimus* had strong legs for running.**

**OVIRAPTOROSAUR CHECK LIST**

- TWO-LEGGED
- BROAD SHORT HEAD
- FAST MOVER
- TWO 'TEETH'



### HANDS UP

The hands of a dinosaur like *Struthiomimus* were slim and delicate. But the dinosaur could have gripped hard with its three-clawed fingers. It may have used its long arms to pull down high branches so it could nip off buds to eat.

***Struthiomimus'* long arms could reach the leaves on the trees.**

### BITING BEAK

Like the ostrich dinosaurs, *Oviraptor* had a horny beak covering its jaw bones, but this was more sharply curved. *Oviraptor* probably used its beak to cut through food – just like a modern bird or turtle does. The ostrich dinosaurs had a toothless bite. But *Oviraptor* had two sharp, tooth-like prongs pointing down from the roof of its mouth.

### PRONG PUZZLE

What did *Oviraptor* use its two prongs for? The first *Oviraptor* skeleton found was lying over a clutch of *Protoceratops* eggs. Experts guessed it was caught stealing the eggs.

### Is it true that *Dromiceiomimus* was extra brainy?

*Dromiceiomimus* did have a big brain for a dinosaur. But it was not necessarily any more clever. It probably used its brain to make sure it moved as efficiently as possible when it was running or gathering food.

### CRUSHING BITE

Scientists think *Oviraptor* used its two prongs to crush egg shells and then gobble up the contents. So they named the dinosaur 'egg thief'. Sometimes it would have been caught in the act and killed.

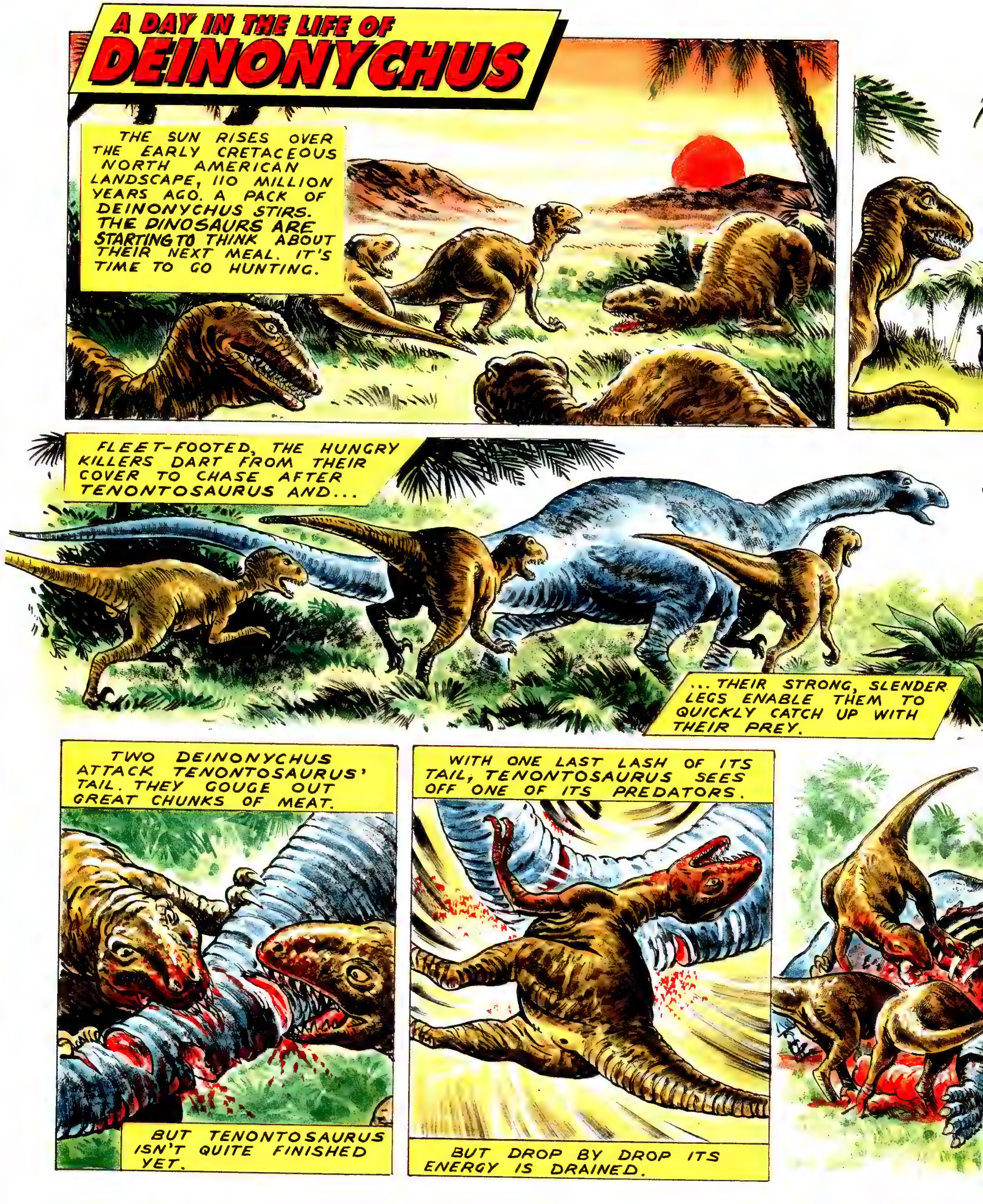
### BUMPS AND CRESTS

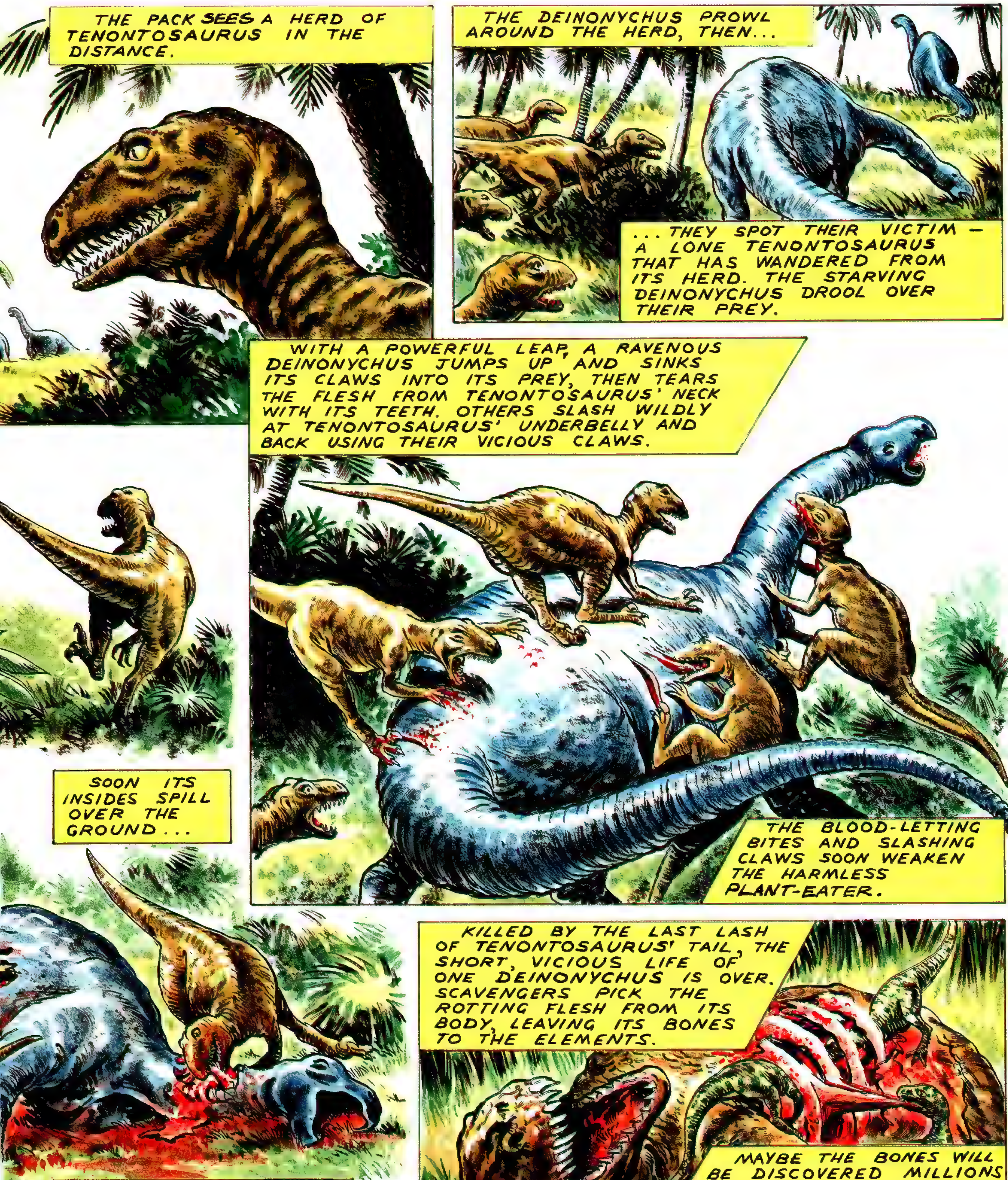
Some *Oviraptors* had a nose bump while others – probably the males – had an elaborate crest which they may have used in courtship displays.

**Some *Oviraptors* had a nose bump while others had a crest.**

**In the Age of the Dinosaurs ornithomimosaurs and oviraptorosaurs were built for speed – like today's ostriches.**

# A DAY IN THE LIFE OF DEINONYCHUS


THE SUN RISES OVER THE EARLY CRETACEOUS NORTH AMERICAN LANDSCAPE, 110 MILLION YEARS AGO. A PACK OF DEINONYCHUS STIRS. THE DINOSAURS ARE STARTING TO THINK ABOUT THEIR NEXT MEAL. IT'S TIME TO GO HUNTING.
FLEET-FOOTED, THE HUNGRY KILLERS DART FROM THEIR COVER TO CHASE AFTER TENONTOSAURUS AND...
...THEIR STRONG, SLENDER LEGS ENABLE THEM TO QUICKLY CATCH UP WITH THEIR PREY.
TWO DEINONYCHUS ATTACK TENONTOSAURUS' TAIL. THEY GOUGE OUT GREAT CHUNKS OF MEAT.
BUT TENONTOSAURUS ISN'T QUITE FINISHED YET.
WITH ONE LAST LASH OF ITS TAIL, TENONTOSAURUS SEES OFF ONE OF ITS PREDATORS.
BUT DROP BY DROP ITS ENERGY IS DRAINED.


THE PACK SEES A HERD OF TENONTOSAURUS IN THE DISTANCE.
THE DEINONYCHUS PROWL AROUND THE HERD, THEN...
... THEY SPOT THEIR VICTIM — A LONE TENONTOSAURUS THAT HAS WANDERED FROM ITS HERD. THE STARVING DEINONYCHUS DROOL OVER THEIR PREY.
WITH A POWERFUL LEAP, A RAVENOUS DEINONYCHUS JUMPS UP AND SINKS ITS CLAWS INTO ITS PREY, THEN TEARS THE FLESH FROM TENONTOSAURUS' NECK WITH ITS TEETH. OTHERS SLASH WILDLY AT TENONTOSAURUS' UNDERBELLY AND BACK USING THEIR VICIOUS CLAWS.
THE BLOOD-LETTING BITES AND SLASHING CLAWS SOON WEAKEN THE HARMLESS PLANT-EATER.
SOON ITS INSIDES SPILL OVER THE GROUND...
AND THE PACK EATS ITS FILL BEFORE MOVING OFF.
KILLED BY THE LAST LASH OF TENONTOSAURUS' TAIL, THE SHORT, VICIOUS LIFE OF ONE DEINONYCHUS IS OVER. SCAVENGERS PICK THE ROTTING FLESH FROM ITS BODY, LEAVING ITS BONES TO THE ELEMENTS.
MAYBE THE BONES WILL BE DISCOVERED MILLIONS OF YEARS LATER. BUT MORE LIKELY, THEY WILL NEVER BE SEEN AGAIN.

Improve and test your knowledge with...

# FACT FILE

Follow the footprints to complete the quiz and get to the bottom of the question!

**1** *Anchiceratops'* head was mostly filled with:

a) hot air
b) muscle and bone
c) a large brain

**2** *Anchiceratops* had:

a) a large jaw with long teeth
b) two long eyebrow horns
c) a spiny back

## Egg layers down under

Most mammals give birth to live young. But early mammals probably laid eggs, like reptiles. Today, only two mammals lay eggs, Australia's platypus and spiny anteater.

**6** Arthropods had:

a) stiff, inflexible legs
b) lots of long hair
c) no backbone

**7** *Becklespinax* may have used its 'spine tail' to:

a) help it swim
b) control its body heat
c) injure its enemies

**8** At a famous Russian banquet, scientists ate:

a) pork chops
b) mammoth steaks
c) roast beef

**9** Ice Age mammals were larger than mammals today:

a) to help them keep warm
b) to frighten dinosaurs
c) to see over trees

## Prehistoric years lasted longer!

About 300 million years ago, the seas were brimming with animal and plant life. Coral, which is still alive today, was abundant in these prehistoric waters. Each coral is made up of many tiny animals, and a new band of coral is built each day. Experts who have studied these bands think that over 300 million years ago there were probably 400 days in a year - 35 more than there are now!

## Star-spangled dinosaur

Diplodocus was nicknamed the 'star-spangled' dinosaur after the US national anthem because a skeleton of the dinosaur was found on July 4th, American Independence Day.

**10** *Deinonychus* hunted large plant-eaters:

a) when it couldn't catch meat-eaters
b) usually in packs
c) only at night

**3** To catch its prey, *Pterygotus* used:
a) its poisonous bite
b) two huge pincers
c) its spear-like tail

**4** 'Bird' dinosaurs' only defence was:
a) a huge thumb claw
b) their ability to run very quickly
c) sharp, knife-like teeth

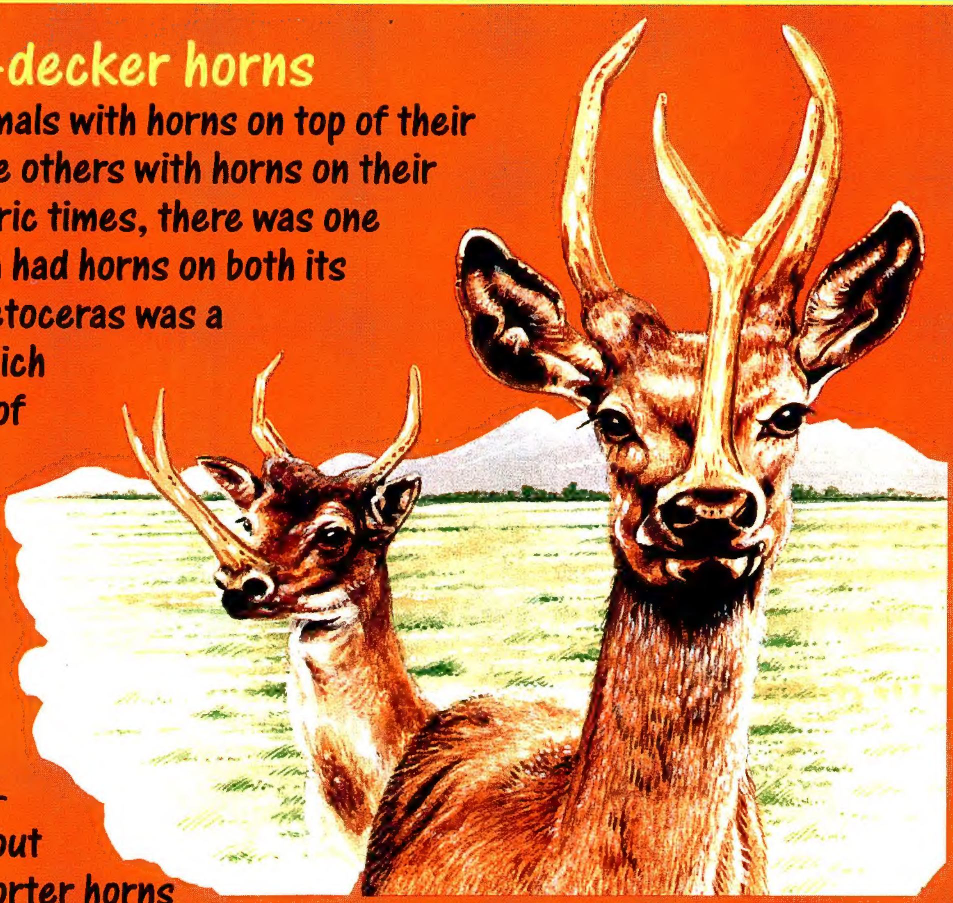
**5** An *Oviraptor*'s diet consisted of:
a) junk food
b) dinosaur eggs
c) large steaks

## Plants fight back

Some of the plants that lived during the Age of the Dinosaurs had defence mechanisms which protected them from the plant-eaters. Cycads, for example, developed very spiky, tough leaves. Horsetails tasted horrible and magnolias simply grew back very quickly. These defences helped the plants to survive the ravenous appetites of plant-eating dinosaurs more easily. Such plants are still very difficult for animals to eat today. They are true survivors from the world of dinosaurs!

## Double-decker horns

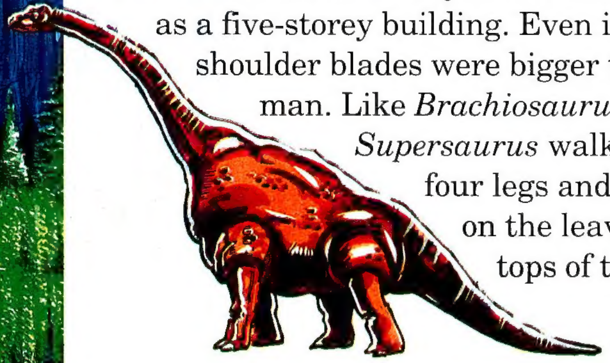
Today there are mammals with horns on top of their heads, and there are others with horns on their noses. But in prehistoric times, there was one strange animal which had horns on both its nose and head! Synthetoceras was a deer-like creature which belonged to a group of hoofed mammals called artiodactyls. They lived in North America during the Early to Late Miocene Period and the males had very strange horns. One Y-shaped horn jutted out above the nose and shorter horns curved back behind their eyes.


**Synthetoceras**

Answers to the questions on inside back cover

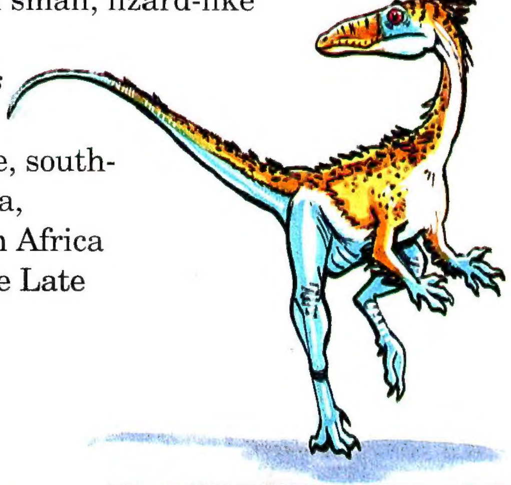
**SUPERSAURUS** **145 MYA**

*Supersaurus* (soo-per-saw-rus) means 'super reptile'. Jim Jenson discovered part of the skeleton of this extraordinary dinosaur in 1972 in Colorado, USA. Its body was as long as three buses and it may have been as tall as a five-storey building. Even its shoulder blades were bigger than a man. Like *Brachiosaurus*, *Supersaurus* walked on four legs and browsed on the leaves at the tops of tall trees.



**SYNTARSUS** **205 MYA**

About as long as a rhinoceros, *Syntarsus* (sin-tar-sus) was a lightly-built dinosaur that chased its prey on two long, powerful legs. Its name means 'fused ankle' and refers to the way its ankle bones were joined together. *Syntarsus* had short arms and a curved claw at the end of each of its three fingers which helped it to grasp its prey of small, lizard-like reptiles. *Syntarsus* lived in Zimbabwe, south-east Africa, and South Africa during the Late Triassic Period.



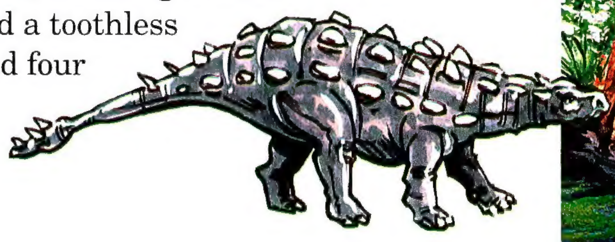
**SZECHUANOSAURUS** **145 MYA**

Four big, jagged-edged teeth were the first fossils ever found of this large flesh-eater from Sichuan, China. *Szechuanosaurus* (sich-wan-oh-saw-rus) was as long as two cars and walked on two huge legs. With its short arms and long tail, it looked like a smaller version of *Allosaurus*.

## T

**TALARURUS** **80 MYA**

A plant-eating dinosaur from southern Mongolia, *Talarurus* (tal-ah-roo-rus) was longer than two small cars. Its body was covered in hollow spines and thick, bony plates. At the end of its tail was a heavy, bony club used to swipe at predators. *Talarurus,* meaning 'basket tail', had a toothless beak and four sturdy legs.

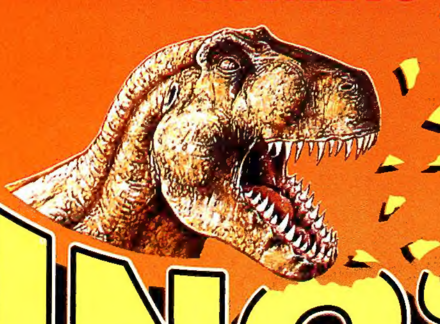


**TANIUS** **75 MYA**

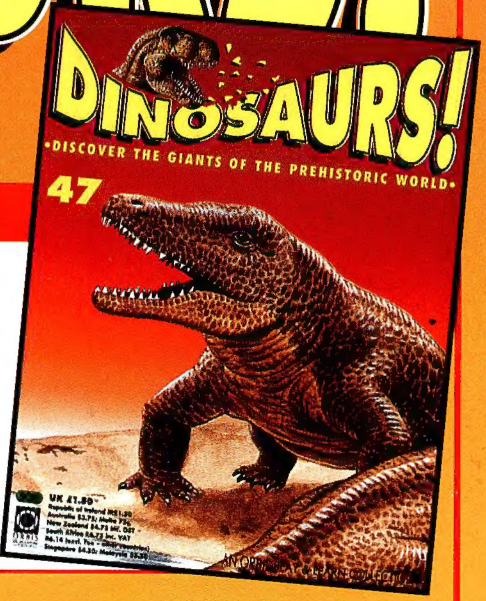
*Tanius* (tan-ee-us) lived in Shandong, China, in the Late Cretaceous Period. It was a duckbilled dinosaur with a flat head and broad, toothless beak. Like other hadrosaurs, it was able to eat tough vegetation with the help of the grinding surface of its cheek teeth. *Tanius* was given its name, meaning 'of the Tan', by Swedish palaeontologist Carl Wiman, in 1929.

**MYA = MILLION YEARS AGO**

## COMING IN PART 47 OF



# DINOSAURS!



Which dinosaurs were the first to appear on Earth? What was the world like then? Find out in PREHISTORIC WORLD.

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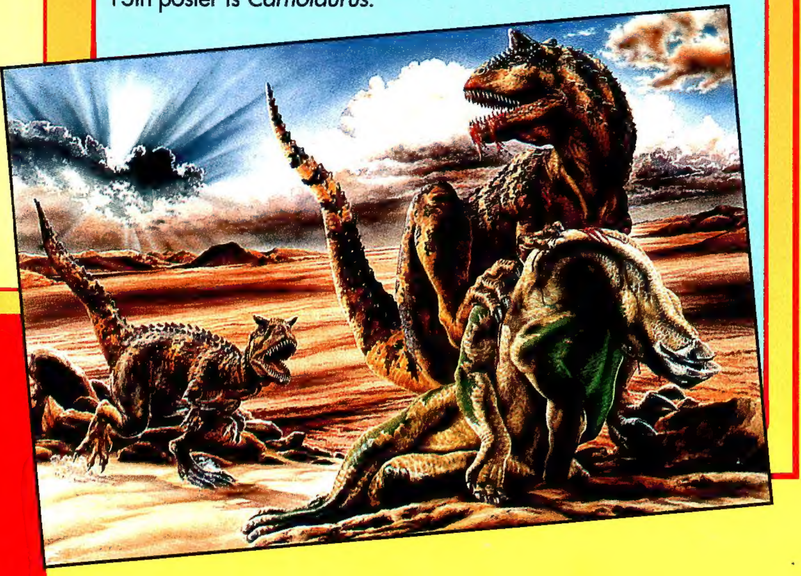

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**ANSWERS TO FACT FILE QUESTIONS:** 1.b 2.b 3.b 4.b 5.b 6.c 7.b 8.b 9.a 10.b

# ASK THE EXPERT

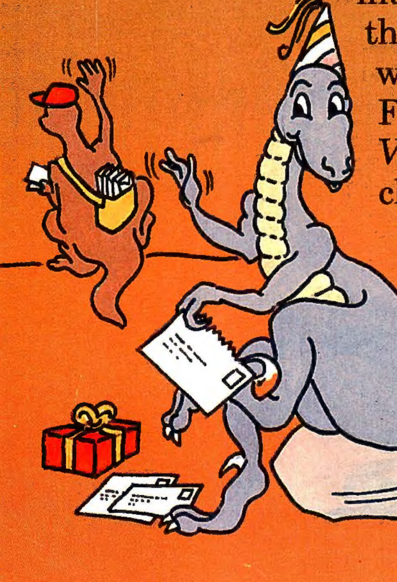
**Dr David Norman of Cambridge University answers your dinosaur questions**

## Which was the first animal on earth?

No-one really knows! Some of the earliest organisms were simple, single-celled creatures that lived on the sea floor about 3,500 million years ago. Their fossils have been discovered in Australia. More complicated types of animals began to appear at the end of the Precambrian and the start of the Cambrian Periods, about 600 million years ago. Small shells, which may have belonged to snails, have been discovered along with a range of odd creatures called Vendozoans – which may have been plants or animals.

## Why did Velociraptor's claws stick out?

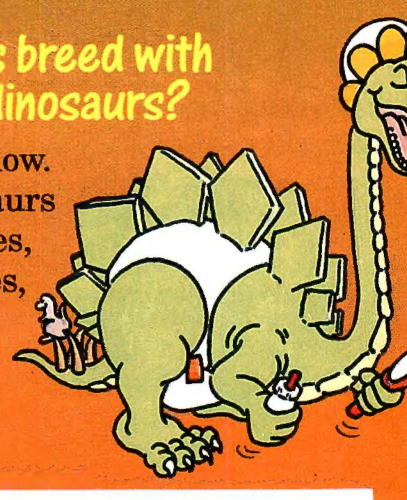
*Velociraptor* had one large and sharply-pointed claw on each of its feet – rather like a cat's claws. Cats' claws can be drawn into their paws. This saves them from becoming blunt when the cats walk or run. For the same reason, *Velociraptor* held its large claw up and away from the ground, so the claw would stay sharp for its deadly purpose.



## What is a prehistoric animal?

A prehistoric animal is any creature that lived before about 10,000 years ago. The last 10,000 years of Earth's history make up the most recent geological time division. It is known as the Holocene or Recent Epoch and is dominated by the rise of humans and their civilisations. This period is studied by archaeologists. Earlier times are studied by palaeontologists who deal with prehistoric creatures.

## Could dinosaurs breed with other sorts of dinosaurs?



Not as far as we know. We separate dinosaurs into individual types, species, or creatures, just as we divide modern animals, like cats and foxes, into different species. Like these animals, dinosaurs are unlikely to have interbred.

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